ASTR A100: INTRODUCTION TO ASTRONOMY

Item	Value
Curriculum Committee Approval Date	10/06/2021
Top Code	191100 - Astronomy
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
Associate Arts Local General Education (GE)	• OC Physical/Biological Sci - AA (OB)
Associate Science Local General Education (GE)	• OCC Physical/Biological Sci-AS (OSB)
California General Education Transfer Curriculum (Cal-GETC)	• Cal-GETC 5A Physical Science (5A)
Intersegmental General Education Transfer Curriculum (IGETC)	• IGETC 5A Physical Science (5A)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B1 Physical Science (B1)

Course Description

Introduction to the origin, evolution and structure of the solar system, stars, galaxies and the Universe. Milestones in the science of astronomy from ancient times to the space age. Historical development of astronomical ideas leading to current models. Special focus on the latest discoveries from both ground- and space-based instruments. Consideration of current controversies in astronomy and the future of astronomical research. Enrollment Limitation: ASTR A100H; students who complete ASTR A100 may not enroll in or receive credit for ASTR A100H. Transfer Credit: CSU; UC: Credit Limitation: No credit for ASTR A100 or ASTR A100H if taken after ASTR A101 or ASTR A102 or ASTR A103.

Course Level Student Learning Outcome(s)

1. Explain how the scientific method has been (or is being) used to distinguish between competing explanations of astronomical phenomena.
2. Describe various naked eye sky observations and summarize what they reveal about motions of solar system objects. Explain the historical significance of these observations.
3. Apply physical principles of motion and light to explain astronomical phenomena, including planets, stars, and galaxies.

Course Objectives

- 1. Define astronomy, describe the process of science, and offer examples of the dynamic and ever-changing nature of this discipline.
- 2. Describe the appearance and motions of the sun, moon, planets, and stars that can be observed with the naked eye, and explain related phenomena such as eclipses and seasons.
- 3. Identify the historical contributions of Ptolemy, Copernicus, Tycho, Kepler, Galileo and Newton, and discuss how astronomy developed from the ancient conceptions of the Greeks to a modern understanding of gravity, tides, and orbital motion.
- 4. Explain the interaction of light and atoms, and discuss how telescopes and associated instruments are used to gather and analyze light at different wavelengths to measure the physical characteristics of stars and galaxies.
- 5. Describe the interior and atmosphere of the Sun, including the nuclear processes taking place in its core and surface phenomena (such as those that affect the Earth).
- 6. Discuss how astronomers determine the basic properties of stars (such as distance from Earth, luminosity, mass, and diameter) and explain how these properties change at different stages of a stars life.
- 7. Explain the physical processes taking place during the birth, life, and death of stars and binary star systems.
- 8. Describe the structure, behavior, origin, and evolution of galaxies (including our Milky Way), explain the phenomena associated with active galactic nuclei, and discuss the distribution of galaxies throughout the universe.
- 9. Explain the fundamental principles of cosmology, including the shape of space-time, evidence for the big bang, and effects of inflation and acceleration of the universe.
- 10. Summarize the basic features of our solar system, the physical processes involved in its formation, and evidence for extrasolar planetary systems.
- 11. Compare and contrast the similarities and differences among the terrestrial planets, Jovian planets, and smaller bodies of our solar system.
- 12. Summarize what is known about the origin and nature of life on Earth, and relate this to the search for possible life beyond our planet.

Lecture Content

Ancient astronomyNaked eye observations of the sun, moon, planets and stars, including eclipses, etc.Copernican revolutionRelativityLight and optics and spectraOverview of solar systemEarth and MoonSunMinor members of the solar systemMercury, Venus and MarsThe Jovian planets and satellites, and PlutoMeasuring the basic properties of starsStellar energy sources and the H-R diagramThe formation of starsThe deaths of stars including white dwarfs, neutron stars and black holesThe Milky Way GalaxyOther galaxies and clusters of galaxiesCosmologySearch for extraterrestrial intelligence

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)

Instructional Techniques

Lecture and application of ideas. Slide-lectures to illustrate concepts

Reading Assignments

Readings from the textbook, magazine articles about relevant topics (2 hours per week)

Writing Assignments

Term paper based on books, periodicals, internet, educational television or film, extracurricular lectures, field trips, etc. (2 hours per week)

Out-of-class Assignments

Regular homework assignments (done on paper or online) (2 hours per week)

Demonstration of Critical Thinking

Two midterms and a final exam and a term paper. Exam grades are based on proficiency in subject matter demonstrated, in part, by means of essays and/or problem solving.

Required Writing, Problem Solving, Skills Demonstration

Term paper based on books, periodicals, internet, educational television or film, extracurricular lectures, field trips, etc.

Eligible Disciplines

Physics/Astronomy: Masters degree in physics, astronomy, or astrophysics OR bachelors degree in physics or astronomy AND masters degree in engineering, mathematics, meteorology, or geophysics OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Fraknoi, A., Morrison, D. Wolff, S.. Astronomy (OER), 18 ed. Houston: XanEdu Publishing Inc., 2021